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The following is the authors' final draft of a manuscript that was accepted for publication and, after editing and typesetting, was published as:

"Social Red Bull: Exploring Energy Relationships in a School District Leadership Team"

By ALAN J. DALY, YI-HWA LIOU, AND CHRIS BROWN

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Thank you.

Social Red Bull:

Exploring Energy Relationships in a School District Leadership Team¹

Abstract

Educational leaders have long been expected to be not only effective leaders, but also motivators who can move change efforts forward. Although there has been attention paid to the role of “effective” leaders, much less work has contributed to “affective” relations between and among educational leaders. In this study we explore the idea of positive affective arousal through “energy relationships” between and among a district leadership team. “Energizers” in social systems have been associated with positive individual and organizational outcomes, but are rarely studied in education. Drawing on theories of social networks and using multilevel network modeling, findings suggest that perceptions of job satisfaction, innovative climate, and leader efficacy, as well as work experience and gender help explain the likelihood of sending, receiving, and sharing energy relationships. Implications are discussed.

Key words: Energizers, Efficacy, Educational leadership, Social network, Organizational learning, Innovation, Job satisfaction, Multilevel p_2 model.

¹ First two authors contributed equally to the work

Introduction

Improving educational outcomes for students from traditionally marginalized backgrounds *is* the key work for research and practice. It is with this imperative in mind that we examine the relationships between and among almost 100 educational leaders in a mid-sized urban fringe school district that has been successfully serving a diverse student population. The district has in place an explicit focus on cross level interaction throughout the system and is in the midst of implementing the Common Core State Standards (CCSS). Successfully implementing the standards in this setting requires leaders to communicate, collaborate, and motivate others to work toward a common goal. This suggests the importance of the social interactional work necessary for implementation, which moves beyond important content knowledge of and technical expertise in relation to the CCSS, to a world of interconnected relationships and meaning making.

The social interactional work of the change process is receiving increased attention in the research as a fundamental component in reform (e.g., Coburn & Russell, 2008; Daly, 2010; Penuel, Riel, Krause, & Frank, 2009). However, most of that research focuses primarily on the instrumental (work related) social interactions such as work-related advice seeking or expertise between teachers (Daly, 2010). Less attention has been paid to the quantity and quality of relations between and among educational leaders as they go about their work (see Daly & Finnigan et al., 2010, 2011, 2012 for exceptions), particularly in relation to expressive (affective/emotional) social ties, which have been shown to be important in improvement (Daly, Liou, Tran, Cornelissen, & Park, 2014; Liou, 2015).

In response to this gap, we focus on one specific expressive relation, “energy exchange” between educational leaders. The organizational literature on “energizers” suggests that interactions with these individuals are likely to create mutual activity and strong norms of cooperation (Collins, 1993). Furthermore, there is a body of work to indicate that energizers may also enhance institutional commitment and engagement, as well as improve individual and organizational outcomes (Cross, Baker, & Parker, 2003; Cross, Linder, & Parker, 2007; Kuvaas & Dysvik, 2009; Taylor & Pillemer, 2009). We argue that energy relationships may also catalyze work motivation, satisfaction, and ultimately goal attainment of educational

leaders. In meeting our research aims we explore individual leader level factors (e.g., job satisfaction and leader efficacy) along with organizational factors (e.g. innovative climate), that may be associated with the sending and receiving of energy relations for one district leadership team situated in Southern California.

This study is guided by the following research questions:

1. What is the social structure of energy relationships (density, reciprocity, etc.) within a districtwide leadership team?
2. To what extent are energy relationships accounted for by key factors such as job satisfaction, innovative climate, and leader efficacy?

Conceptual Framework

We set up our framework by first discussing core concepts related to social capital and social networks in general. We then focus on “energy” relationships, which represent the key type of expressive social tie that we are trying to understand in the study. Finally, we end with a review of literature around core constructs that have a hypothesized relationship with the existence of an energy tie including: job satisfaction, innovative climate, and leader efficacy.

Social Capital and Network Theory

Social relations are instrumental to maximizing the benefits of any human capital investment (Coleman, 1988; Smylie & Hart, 1999). Spillane and colleagues reflect this idea noting that while, “human capital is undoubtedly important for school and school-system productivity, [by] fixating primarily on human capital, we miss or undermine the significance and potential of social capital” (2015: online). Productivity in this sense is not just an individual matter, but also a social imperative. As a result, school improvement initiatives may need to consider leveraging the social synergies that can increase return on human capital investments, as “social capital is much more than the aggregate of members’ human capital” (Spillane, Hopkins, & Sweet, 2015).

In terms of defining social capital, of particular importance is the idea that social relations can act as channels for accessing and using resources (e.g., expertise, friendship) for purposive actions (Daly, 2010).

Since resources can “flow” through social relationships, they can be shared, mobilized or even hoarded. In this regard, social capital can be thought of as the “resources and information” (Baker-Doyle & Yoon, 2010, p. 118), which can be “mobilized when an actor wishes to increase the likelihood of success in purposive action” (Finnigan & Daly, 2010, p 180). The attainment of social capital is reflected in the ability of individuals and organizations to leverage relational ties in order to successfully engage with or share (or transmit) with others (Borgatti et al., 2013).

Social relations are neither necessarily “natural” nor a given (Bourdieu, 1986), but they can be enhanced by leaders looking to implement successful change initiatives as well as ensure that the benefits of such initiatives are maximized (Spillane et al., 2015). However, before social ties can be strengthened and leveraged toward outcomes, understanding the theory and structure of these relationships is important. Here we turn to social network theory and analysis, which provides a framework and set of methods that can both focus and illuminate the pattern of social ties that exists between individuals in a social network (Scott, 2000).

Several basic assumptions underlie social network theory and these assumptions offer insights into the affordances and constraints of the perspective (Burt, 1982; Degenne & Forsé, 1999). First, actors in a social network are assumed to be interdependent and interconnected (Degenne & Forsé, 1999). Second, relationships are regarded as ties that provide for the exchange and flow of resources between actors (Kilduff & Tsai, 2003). Third, the structure of a network has influence on the resources that flow to and from an individual as well as across a system (Borgatti & Foster, 2003). Fourth, social networks yield both opportunities and constraints for individual and collective action (Gulati, 1995). A network perspective shifts our focus from solely individual attributes to examining the interconnected pattern of relations between individuals.

Within social relations, the quality of ties generally takes on one of two forms: instrumental or expressive (Ibarra, 1993). *Instrumental relationships* refer to work-related relationships that are ultimately targeted at achieving work goals, such as the exchange of work materials or task related information or

expertise. *Expressive relationships* refer to more emotionally laden relationships that are not directly aimed at work. Interest in these expressive ties typically go beyond that of formal organizational concerns, and include such ties as friendship and personal guidance (Burt, 2005). Although these ties go beyond more work related relations, expressive relations have also been identified as being consequential to executing work related tasks (Daly, 2010; Ibarra, 1993). In general, expressive ties are believed to be stronger, more durable, and trustworthy in contrast to “weaker” instrumental relationships due to the affective nature of the tie (Granovetter, 1973; Marsden, 1988). Some scholars argue that expressive ties can in fact augment and strengthen the flow of resources between actors (McPherson et al., 2001) making complex goals easier to accomplish. Given the importance of expressive ties we focus on what is termed an “expressive energy” relation between leaders, which we term “energy relationship.”

Energy Relationships

“Energy relationships” can be defined as “a type of interaction that increases positive affective arousal, which people can experience as emotion—short responses to specific events—or mood—longer-lasting affective states that need not be a response to a specific event” (Quinn & Dutton, 2005, p. 36). This idea contrasts to another commonly experienced organizational social phenomena, that of the “de-energizers,” “energy sinks,” or “energy vampires.” De-energizers tend to reduce positive affective arousal in others and as such may take up significantly more time for interactions, leaving others feeling less motivated or enthusiastic than when the interaction began (Louw & Sutherland, 2012). De-energizers are often characterized by a tendency toward constantly pointing out obstacles, negative affect, failing to listen to others, limited empathy, and a lack of commitment and flexibility to generate ideas (Cross et al., 2007).

In an education setting, one can imagine a de-energizing leader may not engender motivation, inspiration, or commitment to improving outcomes (Blaydes, 2004; Gamage, 2009). These energy vampires may also be constantly engaged in negative discourse about the future or the possibility of change as well as focusing on the mistakes of others rather than using errors as a point of learning and departure (Cross et al., 2007; Gordon, 2008). One study indicated that 90% of the work-related anxiety is brought on by these de-

energizers who often inhibit innovation and create unnecessary barriers (Cross, Gray, Gerbassi, & Assimakopoulos, 2012).

In contrast, a growing number of organizational studies in business and management have been exploring expressive “energy relationships” as one aspect of affective interaction that is critical in work engagement and motivation (Collins, 1993; Cross et al., 2003; Quinn & Dutton, 2005). Work in this area often occurs within the larger field of positive organizational scholarship (Caza & Cameron, 2008) and suggests that energy relations may influence not only shaping of positive relationships across an organization (Cross et al., 2007), but may also positively impact an individual’s task performance (Amabile, Barsade, Mueller, & Staw, 2005). In addition, pro-social expressive ties, such as energy, have been shown to facilitate the transfer of uniquely held and useful resources and knowledge between individuals (Levin, Kurtzberg, Phillips, & Lount, 2010). Actors with positive affective relations with others tend to be more sociable (Waugh & Fredrickson, 2006) and this sociability may mitigate a sense of discomfort and overcome cognitive resistance and anxiety (Levin & Cross, 2004; Levin et al., 2010). Having stronger affective relations may also buffer individuals from conflict as well as support others overcoming fears that may be associated with exploring and enacting new approaches (Wittenbaum & Bowman, 2004). In other words, when one has a deeper affective connection with another it increases the ability to reach understanding more quickly and perhaps engage and share at a deeper level.

Research on “energizers” suggests that relationships or social ties with these individuals are likely to create mutual activities and strong norms of cooperation (Collins, 2004). Further, there is a body of work that indicates that energizers may also enhance commitment and engagement with the organization, as well as improved individual and organizational outcomes (Cross et al., 2003; Kuvaas & Dysvik, 2009; Taylor & Pillemer, 2009; Yoon & Thye, 2002). Other work around energy interactions suggests that when one feels energized there is also an increase in creativity and innovation for both the energizer and the individual with whom the energizer interacts (Carmeli & Spreitzer, 2009). Energizers are more likely to get others inspired and excited about an idea and support them to go beyond what they thought was possible (Cross et al.,

2007). In sum, energizers have been identified as important in organizational improvement given their potential to, reduce work related anxiety, motivate others, and provide them with the “social energy” necessary to collectively move complex work forward (Cross, et al., 2012; Cross et al., 2003, 2007; Casciaro, 2014). As such we are interested in understanding what may be associated with the likelihood of one having an energy relationship or social tie.

The definition of “positive energy relationship” provided by Quinn and Dutton (2005) points to the importance of the affective component in interactions between and among individuals in business settings. However, despite the potential of this type of affective interaction, we have limited knowledge about “energizers” within an educational leadership setting. In terms of implementing change, as would be the case in the CCSS, research on energizers suggest that they excel at attracting others to a project and influencing them to move ideas forward (Cross et al., 2003). As energizers seem to possess the disposition necessary to support positive climates and attract individuals to ideas (Cross et al., 2012), others with whom the energizer interacts may be more likely to provide discretionary focus and attention to both the energizer and their goals at least for the short term (Quinn & Dutton, 2005). In the longer run, individuals may commit their “discretionary” time or other resources toward the goals the energizer puts forth given their capacity to motivate and inspire a sense of possibility (Quinn & Dutton, 2005). As such energizers can initially draw individuals in and potentially convert that initial attraction to longer term commitment—either way energizers play important role in social systems and yet we know little about factors that are associated with identifying energizers in educational settings.

This exploratory study aims to address the dearth of research around expressive relations in the educational leadership literature. In addition, we endeavor to provide a unique perspective into the work of district leaders in a successful system as they strive to improve outcomes for students. In conducting our study we will draw on the aforementioned social network theory and examine a set of key factors outlined below that we argue may provide insight into the mechanisms associated with the energy ties. Specifically, in understanding energy ties, we examine the dyads of leaders that have energy ties as our outcome variables

with several independent variables that may offer insights into the mechanisms (job satisfaction, innovative climate, leader efficacy, and demographics) associated with an energy tie between leaders in a district team.

Job Satisfaction

The field of organizational behavior places great emphasis on understanding how organizational members are motivated to expend efforts on organizational goals (Luthans, 1998). Job satisfaction has been identified as key influencer on work motivation with more satisfied individuals expending more discretionary effort and energy (Kahn, 1992; Luthans, 1998; Quratulain & Khan, 2015). Given this literature, we argue that individuals' satisfaction with their jobs is positively related to the likelihood of having an energy tie.

Job satisfaction is generally defined as a pleasurable or positive emotional state as a result of one's position (Newby, 1999). Studies in education indicate that poor job satisfaction is related to burnout (Skaalvik & Skaalvik, 2010), occupational stress and a reduction in effort (van Saane, Sluiter, Verbeek, & Frings-Dresen, 2003). In contrast, individuals with greater job satisfaction are typically more motivated (Federici & Skaalvik, 2012), perceive a greater sense of professional accomplishment, and demonstrate greater work commitment (Sutter, 1996). In addition, researchers suggest that job satisfaction is positively associated with greater energy toward work (Quinn & Dutton, 2005) and an increased level of work engagement (Caza & Cameron, 2008; Cole, Bruch, & Vogel, 2012; Welbourne, 2014; Welbourne, Andrews, & Andrews, 2005). Moreover, individuals reporting higher job satisfaction tend to actively engage with others in exchanging knowledge as well as proactively seeking out others for information in enhancing job performance (Su, Huang, & Contractor, 2009). Of all the research studies, little work has been proffered that investigates the relationship between job satisfaction and direction of social ties, which we argue are important for understanding a leader's energy relationship. Given the limited literature base, we propose that job satisfaction may be positively related to the increased likelihood of both sending and receiving of energy ties and, as such, hypothesize that *leaders who report higher levels of job satisfaction will have an increased likelihood of sending and receiving energy ties (Hypothesis 1).*

In addition to the individual perceptions of job satisfaction on the likelihood of sending and receiving energy ties, similarity between actors has also been identified as one major predictor of social ties between individuals (McPherson, Smith-Lovin, & Cook, 2001; Louch, 2000). This idea of similarity is grounded in the idea of network homophily, commonly referred to as “birds of a feather flocking together” (McPherson & Smith-Lovin, 1987; McPherson et al., 2001). Actors are likely to develop ties with others whom they consider similar to themselves in some manner whether that be social status, attitudes, values, or beliefs (Kramer, 1999). These homophilous ties form because individuals may perceive a higher degree of predictability in the others’ behavior given the reliability of social norms (van de Bunt, Wittek, & de Klepper, 2005). For example, individuals who have similar political views may interact with one another, given the ability of each to “predict” how the other might see different policies and act on those predictions. However, when two dissimilar actors do form a tie, such heterophilous ties, while useful for new perspectives, tend to also dissolve more quickly than homophilous relations (McPherson et al., 2001) as “predictability” is often difficult and conflict can arise.

Network homophily studies indicate that a dyad (i.e., a pair of individual actors) is more likely to develop and maintain a social relationship if both actors in the dyad share similar characteristics, such as gender, workplace department/unit, or educational level and beliefs (Daly et al., 2015; Marsden, 1988; Reagans & McEvily, 2003). Therefore, attitudinal similarity in job satisfaction between leaders may be viewed as an indicator of mutually shared feelings about work (Cross et al., 2003; Kramer, 1999), which in turn may be positively associated with the likelihood of having an energy relationship. Therefore, given the literature base about homophily we hypothesize that *leaders will be more likely to share energy ties with others who share a similar level of perceived job satisfaction (Hypothesis 2).*

Innovative Climate (IC)

Aside from attributes, studies suggest a number of important organizational level factors in terms of shaping behavior (see Storey & Salaman, 2005; Moolenaar et al., 2014). Among these factors, innovative climate has been identified as crucial to organizational change and improvement (Nonaka & Takeuchi, 1995; Übüs,

Alas, & Elenurm, 2013). As such, we propose innovative climate as the third mechanism that may be associated with the likelihood to have energy relationships. Innovative climate has been widely studied in management and organizational research (Black & Lynch, 2004; Lynch, 2007; Salim & Sulaiman, 2013). Organizations in which individuals perceive a strong innovative climate are characterized by creativity, risk-taking, openness to change, and proactivity (Dundon, 2005; Koch, Cunningham, Schwabsky, & Hauknes, 2005). A positive innovative climate as reported by organizational members is also related to institutional and individual performance and productivity (Bates & Khasawneh, 2007; Salim & Sulaiman, 2013) as well as increased competitive advantage (Bates & Khasawneh, 2007). Innovative climates flourish when there are high levels of organizational trust among members and support more pro-social exchanges (Daly et al., 2014).

Climates that are perceived to be open to novel ideas also enable individuals to explore new interpersonal connections (Fredrickson, 2003), which are critical in generating organizational energy (Cross et al., 2003). Organizations identified with greater innovative climates are associated with a variety of positive aspects particularly related to opportunities for positive exchanges (Collins, 1993). Connectivity and novel exchanges may also augment work engagement leading to positive emotional outcomes such as enthusiasm, elation, and excitement (Spreitzer et al, 2005) which reflect key aspects of energy relations. On the other hand, organizations with less risk-tolerant environments may inhibit the formation of new relations and excitement that can arise from novel experiences (Spreitzer et al., 2005).

Research also suggest that climates that are innovative and open to diverse connections tend to foster a sense of energy and vitality (Dutton & Heaphy, 2003) and as such are more likely to support, motivate, and engaged individuals (Heaphy & Dutton, 2008). These more connected actors may be more willing to interact with one another in exchanging resources (Heaphy & Dutton, 2008). Mutual or reciprocal exchanges may in turn support norms of ongoing interaction and the sharing of new ideas and practices allowing for the refinement of existing knowledge and creation of new insights (Daly, 2010; Frank, Zhao, & Borman, 2004). On the other hand, studies suggest that educational leaders who perceive the climate to be

risk averse are less likely to support norms of risk taking, interaction, and mutual exchanges with others, which in turn may reduce the organization's ability to change, renew, and develop new relations within the organization (Daly & Finnigan, 2010; Liou, 2015). Given the suggested link in the literature between innovative climate and the generation of positive affect, we hypothesize that *leaders who perceive a more innovative climate will have an increased likelihood of sending and receiving energy ties. (Hypothesis 3).*

Shared Efficacy Beliefs

Research indicates that an individuals' sense of efficacy has more direct influence on one's behaviors and actions than perceived professional knowledge when it comes to decision making (Nelson & Guerra, 2014; Pajares, 1992). As such a second key mechanism that may underlie energy relationships is leader efficacy, which has its roots in self-efficacy. Self-efficacy is generally defined as one's belief that she/he can successfully take actions to accomplish certain tasks or achieve goals (e.g., leaders' confidence to implement reform or affect learning) (Bandura, 1993). In educational leadership, self-efficacy has been identified as one key component in individual and organizational outcomes such as learning, teaching, and the ability to take on the leadership role of leading successful reform change (Gareis & Tschannen-Moran, 2005; Leithwood & Jantzi, 2008; Louis et al, 2010). Leaders who share beliefs about leadership efficacy are more likely to collectively achieve outcomes, as they tend to persist even in the face of obstacles (Gareis & Tschannen-Moran, 2005) such as challenges faced with CCSS. Efficacy beliefs are associated with the setting and achieving of goals and as such may engender excitement in others and draw them in to new endeavors, which reflect a central aspect of energy ties (Dutton, 2003). Individuals who experience energizing interactions with one another may be more likely to develop a sense of confidence—a form of self-efficacy. These energizing interactions may assist in reducing natural gaps between people from different backgrounds, valuing individual expertise, and helping to develop and maintain a sense of confidence (Cross et al., 2007; Cross & Parker, 2004). As educational reform is a collective endeavor that requires shared goals, values and beliefs to support change (Honig, 2006), we argue that having similar beliefs may be

important in the outcome of a change effort. As such we offer that individuals with a shared sense of efficacy are likely to exchange energy relationships with others having the same perceived level of efficacy.

Studies in sociology and networks support our argument and suggest that individuals who hold similar or shared efficacy beliefs are likely to develop ties and engage with each other (Lazarsfeld & Merton, 1954; Moolenaar, Daly, & Liou, 2014). These repeated interactions as a result of similar beliefs may enhance the development of trust and stronger bonds (Kramer, 1999) and provide for a more predictable response and as such reduce the “riskiness” of exchanges (Llorens et al, 2007). We extend this idea by examining whether leaders are more likely to exchange energy ties with others with whom they share similar levels of leadership efficacy. Specifically we argue that in a school district, communications and diffusion of knowledge are more likely to occur within homophilous groups who share common beliefs about their ability to impact change (Woods et al, 2013; Moolenaar et al., 2014). As such, individuals who hold similar beliefs about their ability to achieve a common goal are more likely to engage with one another in mutual communication and collaboration. Therefore, we hypothesize that *leaders will be more likely to exchange energy ties with others who share a similar level of efficacy about their ability to implement reform and impact learning (Hypothesis 4).*

Demographic Characteristics Associated with Energy Relationships

Social network studies in education have suggested that in addition to the factors described above, the existence of social relationships may also be dependent on demographic characteristics (Moolenaar et al., 2014; Spillane, Kim, & Frank, 2012). Leaders bring experiences, training, and hold formal roles in organizations, all of which may be associated with the sending, receiving, or sharing ties. Following this argument, we focus on work level, gender, and years of experience as demographic characteristics that may potentially affect leaders’ likelihood to engage energy relationships.

Work level. Previous research in organizations (Lazega & Van Duijn, 1997; Moore, 1990) and education (Coburn & Russell, 2008; Daly & Finnigan, 2011; Spillane et al., 2012) suggests that the formal position of individuals (e.g., role, grade level, and work level) may be related to the extent to which they are engaged in social relationships (cf., Lazega & Van Duijn, 1997). For instance, Lazega and Van Duijn (1997)

found that lawyers were more often sought out for advice when they held a higher hierarchical position. Similarly, the number of relationships in which leaders are involved may be partly defined by the requirements and affordances provided by their work level (district office versus school sites) and by way of professional development and opportunities to interact (Daly et al., 2011, 2010; Honig, 2006; Spillane et al., 2012). As district leaders are further up in the leadership hierarchy they are expected to relay important policy and organizational information from the district office to site principals and as such “broker” information and motivate others to meet goals in the district (e.g., Coburn & Russell, 2008; Daly et al., 2014). Given their formal position, responsibilities, and motivations, district leaders are likely to generate more relational “traffic.” This also means that such leaders, given their numerous relationships and ability to influence, may also be perceived (over and above others) as sending and receiving more energy ties. We therefore hypothesize that *district office leaders will have an increased likelihood of sending and receiving energy relationships in the leadership team (Hypothesis 5).*

Studies suggest that educators who work at a similar level of position are more likely to interact with each other than with others who occupy different organizational positions (Coburn & Russell, 2008; Daly & Finnigan, 2010). Leaders’ work level (district office or school site) may affect the amount of interaction between leaders at different work levels, and in different roles, as these leaders (district office and principals) may attend different professional development initiatives and leadership meetings (Daly et al., 2010). Leaders at different work levels may have less shared experiences and fewer opportunities to interact with one other, while leaders who share similar work levels may be in more frequent contact than more “distantly” located leaders. These shared experiences and increased opportunities to interact may result in an increased likelihood for leaders from similar work levels to engage relationships with each other (Sutor & Pillemer, 2000), and as such, may also include an increased likelihood to exchange an energy tie. Therefore, we hypothesize that *leaders will be more likely to exchange energy ties with others who work at the same work level (district office or school site) than with others who work at different work levels (Hypothesis 6).*

Gender. Research outside education has indicated that the likelihood of being involved in social relationships may be associated with gender (Ibarra, 1995; Moore, 1990; Pugliesi & Shook, 1998) and that, in general, women tend to be engaged in more social relationships than men (Mehra, Kilduff, & Brass, 2001). These differences appear to be consistent throughout life, and can already be found in early childhood (Parker & De Vries, 1993; Van der Pompe & De Heus, 1993). In several settings, men have been shown to be more frequently sought for relationships by both men and women in order to achieve goals and acquire information (Aldrich, Reese, & Dubini, 1989). As these studies have all taken place outside education, we acknowledge that these gender differences may not hold in educational settings, especially since such educational contexts are typically characterized by a high percentage of women (e.g., Doppenberg, Bakx, & den Brok, 2012; Moolenaar, 2010).

Research in education has provided limited evidence of gender differences among male and female educators in terms of the amount of relationships they possess (e.g., Daly et al., 2015; Moolenaar et al., 2014). Yet, studies have suggested gender differences in educational leadership style, with women tending to engage in more transformational leadership styles and men interacting on a more transactional basis (Ostos, 2012). This difference is potentially important, as transformational leaders are more likely to be engaged in a greater number of social relationships (Leithwood & Jantzi, 2008). Based on the limited work available, we include a hypothesis regarding gender differences. We hypothesize that *female leaders will have an increased likelihood of sending and receiving energy ties than male leaders (Hypothesis 7)*.

Gender similarity between leaders may affect their likelihood to develop social relationships (e.g., Daly et al., 2015; Spillane et al., 2012). Often, organizations are found to be segregated across gender lines (McGuire, 2000), and in education, studies found that same-gender work relations are more frequent and intense than relationships with the opposite gender (Heyl, 1996). Building on these findings, we hypothesize that *leaders will be more likely to exchange energy ties with same-gender leaders than with leaders of the opposite gender (Hypothesis 8)*.

Experience. Finally, the likelihood of forming an energy tie may also be affected by the demographic characteristic of seniority, or years of experience in a particular organization (cf., Lazega & Van Duijn, 1997). In educational settings, recent work suggests that more experienced educators, who have had more opportunities to develop and strengthen relationships, tend to have more social relationships and possess more diverse networks than less experienced educators (Daly et al., 2014, 2015). Accordingly, we hypothesize that *leaders who have been working in the district for a longer period of time will have had more time and opportunities to build their network, and consequentially, will have an increased likelihood of sending and receiving energy ties than educational leaders with fewer years of experience in the district (Hypothesis 9).*

Figure 1 presents a diagram of relationships between study variables. For ease of interpretation we have collapsed sending and receiving energy relationships into one outcome variable even though we ran separate sending and receiving models.

Insert Figure 1 about Here

Methods

Sample and Context

This exploratory study was conducted in 2014 in one mid-size urban fringe school district of more than 20 schools that has consistently and successfully served large population of linguistically and economically diverse student population and is in the process of implementing the CCSS. In 2012, the district redirected its vision and goals toward shared decision making and increased efforts to address issues such as a lack of lateral communications across departments and schools in making collective decisions. Given the district's intentional focus on interactions, as is the case in many other districts, better understanding the patterns of communication and obstacles provides important practical applicability. This case is also interesting as it provides an opportunity to learn more about a successful district that has explicitly focused on implementing the CCSS within a system of shared decision-making and communication as key elements of the improvement.

A total of 98 educational administrators across the district including all the district administrators and school site principals were invited to participate in the study, and 96 of the administrators completed the survey, reflecting an overall response rate of 98%. The sample demographics are presented in Table 1.

Insert Table 1 About Here

Instruments

We administered a leadership survey to collect information about the independent variables of leaders' perceptions of job satisfaction, innovative climate, and leader efficacy, and among the school and district leaders as well as the social network dependent variable of energy relationships all using Likert-type scales.

Social networks. To gather data on our dependent variable of an energy tie we used a social network survey to collect data on the relationships among district office and site leaders. Participating leaders were invited to assess the quality and frequency of interaction with their fellow administrators on multiple instrumental (work related) and expressive (affective) relationships. As this study attempts to explore and understand expressive ties, we report results on the “energy” relationship. Based on earlier work (Cameron, Dutton, & Quinn, 2003; Cross, Baker, & Parker, 2003; Quinn & Dutton, 2005), we developed a network question that would address an “energy” relationship (a similar concept to ‘energetic arousal’ by Thayer, 2000). Therefore, in examining the energy ties among educational leaders, we asked respondents to assess the frequency of interactions with other leaders from the prompt *“with whom do you experience an increase in energy after an exchange, by ‘energy’ we mean a positive, encouraging, and motivating interaction.”* Our field tests of the energy relationship item included interviewing practicing administrators to further delineate the question. We then validated the network question by randomly selecting 25% of the administrators to identify both someone with whom they had energy relationships as well as asking them to name a colleague who they believed might also identify them as someone with whom they have an energy relationship. Once collected, we compared this data with the actual network data of nominators and their nominees to see the level of match. This resulted in an 86% co-occurrence, providing another level of

validation for the question. We acknowledge that there is room for misinterpretation of the relationship. However, as this work is one of the first forays into this area for social networks in education, specifically with a district leadership team, the study provides an opportunity for theory building. For ease of response, we provided the participants with a roster with the names of the district office leaders and the school site principals. Respondents could indicate with whom they had an energy relationship by selecting any of the names of other leadership team members. The number of nominations that respondents could make was unlimited within a bounded set of names (Holland & Leinhardt, 1973; Scott, 2000).

Job satisfaction (JS). The JS scale was adopted based on previously validated instruments that have been widely used in business as one important construct to measure employees' well-being (see Brayfield & Rothe, 1951; Judge, Locke, Durham, & Kluger, 1998). The validated JS scale is a single construct that consists of 5 items on a six-point Likert-type scale. Principal component analysis (PCA) with varimax rotation yielded a single factor solution that explained 73% of the variance with factor loadings ranging between .65 and .89 (Cronbach's alpha of .78).

Innovative climate (IC). The IC scale was composed of 7 items targeted at the educational administrators, based on a modified version of a well validated scale (Bryk, Camburn, & Louis, 1999; Consortium on Chicago School Research, 2004). These items reflect the extent to which the educational administrators perceive their fellow administrators to be open to innovation and are willing to take risks to improve the district and schools. The items were targeted once at the district office and again at the school sites in order to measure the perceived level of innovative climate of the district administrators as well as the innovative climate of the principals. As previous studies on district wide reform indicate significant degrees of variation as to the perception of innovative climate between and among educational leaders at different levels (cf., Daly & Finnigan, 2009; Moolenaar et al., 2011), we drew on an instrument that addressed district office and principals separately. Respondents could rate the 7 items on a 6-point Likert-type scale, ranging from 1 (Strongly disagree) to 6 (Agree). The internal consistency of the scale was high for both the district office ($\alpha = .96$) as well as the principals ($\alpha = .96$). For the IC—District Administrators construct, PCA with

varimax rotation yielded a single-factor solution that explained 80.0 % of the variance. For the IC—Site Principals construct, PCA with varimax rotation yielded a single-factor solution that explained 81.3 % of the variance. The correlation between both types of innovative climate were found to be high ($r = .71, p < .01$) and PCA with the direct oblimin rotation, in which both scales were included, yielding a two-factor solution that explained 82.4 % of the variance with the original items loading highly onto their respective a priori scales (for IC—District Administrators .76-.97 and for IC—Site Principals .63-.98).

Leader efficacy. We drew upon a modified and shortened version of the Leadership Efficacy Scale used in Tschannen-Moran and Gareis' (2005) studies as well as in our previous work (Daly et al., 2014) that examined the perceptions of efficacy for instructional improvement. The efficacy scale comprised of 18 items that measure three distinct constructs: instructional leadership efficacy, management efficacy, and moral leadership efficacy. Responses for each item were based on a 9-point Likert scale ranging from 1 (None at all) to 9 (A great deal). The first construct, instructional leadership efficacy, had a high internal reliability (7 items, $\alpha = .90$), and PCA with varimax rotation yielded a single-factor solution explaining 64 % of the variance. The second construct, management efficacy, had a high internal reliability (6 items, $\alpha = .86$), and PCA with varimax rotation yielded a single-factor solution explaining 59 % of the variance. The third construct, moral leadership efficacy, had a satisfactory internal reliability (5 items, $\alpha = .74$), and PCA with varimax rotation yielded a single-factor solution explaining 54 % of the variance.

The items and factor loadings of all principal component analyses for each of the constructs are summarized in Table 2.

Insert Table 2 About Here

Demographic variables. Several demographic variables were included to examine the influence of demographics on the likelihood of having energy ties. The following individual variables were included: years of experience in the district and in the current position, work level (district office/school site), and gender (female/male).

Analysis

As we aim to explore the likelihood of having energy relationships between administrators in a district network (including sending, receiving, and sharing energy ties), we used social network analysis to visualize the pattern of these energy relationships and calculate network measures to describe the network properties of leaders. We then use descriptive statistics along with the network measures to describe the characteristics of the study sample. Finally, we use multilevel $p2$ network modeling to test the study hypotheses.

Social network measures. We first provide a visualization of the energy relationships of the leaders to first highlight the pattern of ties across the leadership team using Netdraw software (Borgatti, 2002). A visualization of a social network, in our case the energy network, contains two key elements: nodes and ties. Nodes in this work represent the individual educational leaders and ties (lines with arrows) are relational connections between any given two actors. In this study a tie represents an energy relationship that is sent or received by an actor, or reciprocated between two individuals. As individual actors have different number of ties that are sent, received, or reciprocated with others, their degree of connections for energy relationship varies across the network. In order to illustrate the network pattern and quantify the network of energy relationship between district and site administrators, we calculated key network measures (e.g., density, reciprocity, and degree centralities) using the UCINET 6.0 software package (Borgatti et al., 2002), explained below.

Network density is the total number of ties that are present divided by the total number of possible ties (Hanneman & Riddle, 2005). Density ranges from 0 (no ties are present) to 1 (all possible ties are present). Network reciprocity refers to the proportion of ties that are reciprocated over all possible ties (Hanneman & Riddle, 2005). Network reciprocity ranges from 0 (none of the ties is reciprocated) to 1 (all ties are reciprocated). The outdegree of a leader corresponds to the number of colleagues nominated by the respondent with whom they have an energy relationship and can be interpreted as an indication of individual “activity.” In other words, leaders with high outdegree, compared to leaders with low outdegree,

nominate more individuals with whom they report an increase in energy after an exchange, and as such these leaders can be interpreted as energy seekers.

The indegree of a leader reflects the number of colleagues from whom the respondent received an energy nomination, and can thus be regarded as an indication of individual “popularity.” Meaning, leaders with high indegree are viewed by more others as being energy providers in comparison to leaders with low indegree. Ego-reciprocity reflects the percentage of energy ties of a leader that are reciprocated and is calculated as the ratio of reciprocated relationships to the total number of relationships for an individual. Ego-reciprocity ranges from 0 (none of the administrator’s energy relationships are reciprocated) to 1 (all of the administrator’s energy relationships are reciprocated).

Descriptive statistics. We reported descriptive statistics for the scales assessing JS, IC—District Administrators, IC—Site Principals, and leader efficacy.

Multilevel $p2$ model. Because of the interdependency of the network data of the dependent variable (relationships among individuals), the assumption of data independence that underlies “conventional” regression models is violated. Therefore, we conducted $p2$ modeling to test the effect of individual and dyadic characteristics on having energy relationship (Van Duijn, Snijders, & Zijlstra, 2004). We used the $p2$ program within the StOCNET software suite to run the multilevel $p2$ models (Van Duijn et al., 2004; Zijlstra, 2008; Zijlstra, Van Duijn, & Snijders, 2006).

The $p2$ model is developed to handle dichotomous dyadic outcomes (i.e., ties between two actors). In contrast to a univariate logistic regression model, the $p2$ model controls for the interdependency that resides in social network data. The $p2$ model regards sender and receiver effects as latent (i.e., unobserved) random variables that can be explained by sender and receiver characteristics (Veenstra, Lindenberg, Zijlstra, De Winter, Verhulst, & Ormel, 2007). In the $p2$ analyses, the dependent variable (energy tie) is the aggregate of all the nominations a network member sent to or received from others. A positive effect thus indicates that the independent variable (e.g., a leader’s perceived level of job satisfaction) has a positive effect on the likelihood of having a relationship (in this study, an energy relationship). Similar to

conventional logistic regression, the regression coefficients (reported as log odds ratios) reflect the expected change in the log of the odds associated with a one-unit change in the independent variable (Pedhazur, 1997). Meaning, a one-unit change in the independent variable will result in a change in the likelihood of having a relationship that is comparable to the log odds of the reported coefficient with the corresponding standard error.

The current study addressed two levels of analysis: the dyadic (relational) level and the individual level represented by respectively 7,832 dyadic relationships (Level 1) nested in 96 respondents (Level 2). To examine the influence of individual and dyadic variables on the likelihood of having energy relationships, we estimated a single $p2$ model. Individual covariates are characteristics of individuals, such as perception of JS, innovative climate, leader efficacy, and demographics that may influence the amount of energy ties that an administrator sends (sender, energy seeker) or receives (receiver, energy provider). Individual covariates can be included for the sender of a relationship (sender covariates) and/or the receiver of a relationship (receiver covariates). A relationship covariate yields information on the similarity of two individuals on a given characteristic, such as similarity of work level or gender. More information can be found in other similar studies using $p2$ model (Daly et al., 2015; Zijlstra et al., 2006).²

Interpret $p2$ estimates. The parameter estimates in $p2$ models can be interpreted in the following way. The main parameters of interest concern the sender effects and receiver effects, meaning effects that signify the probability of sending or receiving energy nomination(s). A positive parameter estimate thus signifies a positive effect on the probability of an energy relationship (Veenstra et al., 2007). For example, a positive sender effect of work level (dummy coding; district office/school site) would indicate that leaders working at the school sites (represented by the highest dummy code) would have an increased likelihood of seeking energy relationships than administrators working at the district office (represented by the lowest dummy code).

² For sender and receiver effect on the likelihood of having energy relationships, we also tested a series of parsimonious models in which effect for efficacy was also included as sender and receiver covariates in addition to job satisfaction and innovative climate. However, the efficacy covariates did not statistically significantly improve the model, and thus we reported our findings based on our final model without efficacy as predicting covariates.

We also analyzed homophily effects of the relational covariates such as work level, gender, perceived level of job satisfaction and three aspects of leader efficacy. For these relationship covariates, the $p2$ software constructs dyadic matrices based on the (absolute) difference between two respondents. For example, the relationship between district office administrators and principals would be coded as a relationship between educators who work at different work levels. To facilitate the interpretation of the model, we labeled the dyadic parameters “different work level,” “different gender,” “different job satisfaction,” and “different efficacy.” A negative parameter estimate for “different gender,” for instance, would thus indicate that a difference in gender is negatively associated with the probability of having an energy relationship. Meaning, leaders with different genders would be less likely to report having an energy relationship, and conversely, energy ties would be more likely present among same-gender administrators. As such, negative parameters would provide evidence of the hypothesized homophily effects.

In $p2$ models, two parameters are by default included as they “control” for network effects. The first default parameter is the overall mean density effect. A positive estimate for the density effect indicates that in general, the sample networks are rather dense, while a negative density effect reflects that the networks are rather sparse. The second default parameter is the overall mean reciprocity effect. A positive estimate for the reciprocity effect suggests that symmetric relationships are more likely to occur than asymmetric relationships, and vice versa.

As suggested (Long, 1997), we used the Wald statistic that is then compared to the χ^2 distribution with one degree of freedom to calculate the significance of the effects. In addition, to aid interpretation of statistical significance we report quantiles from the distributions of estimation samples, which provide the Bayesian analogue to a confidence interval. The estimate will be statistically significant ($p < .05$) if the quantiles between 2.5 and 97.5 do not include “zero.”

Findings

Network Sociograms of Seeking and Providing Energy Ties

Table 3 provides two network sociograms of interactions among leaders regarding energy seeking and providing ties as illustrative examples of the study findings. Nodes represent individual leaders and are sized by the amount of relation activity that leaders engages, meaning sending or receiving energy ties (larger nodes equal more activity). The lines between nodes represent the presence of an energy tie between leaders with arrows indicating the direction of a tie. The sender sociogram (sociogram A) indicates that primarily district office leaders (large red nodes) seek more energy relationships, meaning that they tend to identify more people from whom they seek energy. The receiver sociogram (sociogram B) indicates that most energizers are in the central office (large red nodes) with a few principals (larger blue nodes) playing roles as energizers. However, it is also clear that energy relationships are not equally distributed in this district network, with district office leaders more often seeking as well as being sought for energy ties. It is noteworthy that there are few isolates in the energy network, meaning that the majority of leaders are either seeking and/or being sought for energy relations, and there is a very small number of the leaders that do not either seek or are sought for energy relations.

Insert Table 3 about Here

Descriptive Statistics of Energy Network and Actor Attributes

Table 4 presents the results from the descriptive analyses to describe characteristics of the energy network and individual leaders. The results of whole network measures indicate a sparse network structure (density = .04), which is also reflected in the negative overall density effect in the $p2$ output. In addition, 18% of the energy ties are reciprocated, meaning individuals mutually identify one another as being energizers. On average, individual leaders are connected to approximately seven leaders in terms of having an energy relationship. In terms of self perceptions, on average, leaders perceive a higher level of their job satisfaction ($M = 3.51$, $SD = 0.39$), overall innovative climate among all leaders (Mean ranging between 5.01 and 5.20, SD ranging between 0.70 and 0.71), and higher efficacy about their ability in instructional leadership and management (Mean ranging between 7.25 and 7.31, SD ranging between 1.16 and 1.29), while some perceptions vary to a larger degree than the others.

Insert Table 4 about Here

The following presents findings from the $p2$ analysis, which tests the extent to which independent variables affect the likelihood of the existence of the dependent variable energy ties (see Table 5). Finally, we close the section by summarizing all the hypotheses and corresponding findings.

Insert Table 5 About Here

Density and Reciprocity of Energy Ties

Overall, the energy network tends to be sparse as indicated by a negative density effect, which also corresponds to the network descriptive statistics. The energy relationship also tends to be reciprocated (mutual), as opposed to unidirectional, as evidence by the positive overall reciprocity effect.

Characteristics Associated with Being Identified as an Energy Seeker (Sender Effect)

Job satisfaction and innovative climate. Contrary to H1 and H3 on the part of leaders' seeking energy ties, we found no significant effects for job satisfaction and both innovative climate covariates on the likelihood of seeking energy relationships. This suggests that leaders' perceptions of their job and whether their colleagues perceive the climate to be innovative do not affect the likelihood of reaching out to others for energy relationships.

Work level, gender, and experience. Supporting H5, we found a significant and negative sender effect for work level. This indicates that leaders who work at the district office are more likely to seek energy relationships from other leaders. Contrary to H7, we found a significant and positive sender effect of gender, suggesting that male leaders, as opposed to female leaders, are more likely to reach out to others for energy ties. No significant effect is found for years of experience on the likelihood of nominating other leaders as those with whom they seek an energy tie.

Characteristics Associated with Being Identified as an Energy Provider (Receiver Effect)

Job satisfaction and innovative climate. In regard to the receiver effect, we test the likelihood of leaders being an energy provider, meaning an actor who tends to be sought by more leaders for energy relationships. Supporting H1, the results indicate a significant and positive receiver effect for leaders'

perception of job satisfaction on the likelihood of being sought for energy relationships. This suggests that leaders who report more satisfaction with their jobs are more likely to be regarded as energizers. The results also support H3 and indicate a positive receiver effect for innovative climate, meaning that leaders who perceive principals as innovative and risk taking are more likely to be nominated as a person with whom others have an energy tie.

Work level, gender, and experience. Supporting H5, similar to the sender effect for work level, we also found a significant and negative receiver effect for work level on the likelihood of being regarded as an energizer. This suggests that leaders who work at the district office tend to be nominated as individuals with whom others experience an increase in energy after an exchange. Contrary to H7, we found a significant and positive effect of gender, meaning that on average, male leaders have a higher probability of being regarded as energizers than female leaders. Partially supporting H9, the findings show a significant positive receiver effect for years of experience working at the district and a significant negative receiver effect for years of experience in the current position. This suggests that leaders who have worked longer in the district, but who have been in their current positions for a shorter period of time, are more likely to be nominated as energy providers in the network.

Dyadic Characteristics Associated with Energy Relationships

Homophily effect of job satisfaction and leader efficacy. Contrary to H2, we found no homophily effect for leaders' perceptions of job satisfaction, suggesting that whether leaders have a similar level of satisfaction about their job does not affect the likelihood of sharing energy ties with other leaders. In addition, our results support H4 on the part of instructional leadership efficacy, and indicate that leaders who have a similar level of efficacy beliefs in their ability to perform instructional leadership are more likely to have shared energy ties.

Homophily effect of work level and gender. Supporting H6, our results show a significant homophily effect for work level, suggesting that leaders who work at same work level are more likely to share an energy relationship. In other words, leaders who work in the district office have an increased

likelihood of seeking, providing, or reciprocating energy relationships with other leaders who work at the district office than with principals. The same also held for principals, with site leaders tending to identify one another. We also found a significant homophily effect for leaders' gender, suggesting that leaders are more likely to share an energy tie with same-gender leaders than with opposite gender individuals.

Summary of Hypotheses and Findings

To conclude, Table 6 provides a summary of the study hypotheses and corresponding findings. Our findings fully support three of the hypotheses regarding the homophily effects of work level and gender and sender/receiver effect of work level. Four of the hypotheses around sender/receiver effect of job satisfaction, efficacy homophily, innovative climate, and years of experience were partially supported. Finally, the hypotheses on job satisfaction similarity and gender were not supported.

Insert Table 6 About Here

Discussion

This affirmative case takes place in a successful district serving traditionally marginalized populations in the context of the CCSS. The district has engaged a number of strategies to build their community including: creating processes for shared decision making; time for collaboration; and providing resources for leaders to informally meet and plan. A cornerstone of the district work includes a focus on collaboration, while also providing autonomy in decision-making. This model is rooted in collaborative relationships and as such makes the district a good case to explore the mechanisms that underlie the presence of energy ties, as work-related energy involves a series of social processes facilitating individual motivation that arouses, energizes, and directs behaviors and performance (Luthans, 1998). Our work explores this important, but understudied expressive aspect of educational leadership and adds to our knowledge base on leadership in context of educational reform.

Building on previous empirical studies that highlight the importance of expressive ties outside of education, we explored the relations between educational leaders and focused on “energy” relationships. As positive affective arousal, energy has been identified as an important component for motivation and

engagement in relation to work-related tasks and innovation. It is noteworthy that all but a few of the leaders in this successful system either seek or are sought for energy, suggesting a well-connected network of energizers. This may be due in large part to the district's strategic improvement efforts described above with a strong focus on fostering a collaborative and innovative climate. The district appears to have developed norms of interaction, which supports risk taking, empowerment, and openness reflecting key elements of energy relationships. Of course there are differences in terms of which actors are more frequently sought, and as such while there is "energy" in the system it seems concentrated primarily with a few individuals. As the district continues its work additional attention may need to be paid to the social aspect of leadership to ensure the diffusion of high quality affective interactions.

Overall our results for those educational leaders who seek energy relationships indicate that these individuals are more likely to work at the district office. This result suggests that district leaders actively sought out energy ties and in this sense may have a greater sense of what is happening across the system. This potential awareness of the system through seeking energy relationships may bode well for identifying future "energizing" leaders. It seems this may already be an implicit strategy given the disproportionate number of energizers who reside in the district office as well as the fact that energizers also tend to be those who have been in the district office for a longer period of time, but in their current positions for less time. Perhaps this implicit effort on identifying and moving leaders who are energizers spreads the impact of these leaders across the system. This combination of findings also suggests that to the degree to which it is possible to formally identify and leverage energizers within a district may support the important work of that system. Adding notions of "affective leaders" to "effective systems" may well be a promising strategy in staffing key leadership roles and expanding concepts of climate and culture.

We also found that leaders who were identified as "energizers" were also more likely to report greater job satisfaction and higher perceptions of innovative climate. Both of these factors have been associated with a host of positive individual and organizational outcomes (Kuvaas & Dysvik, 2009; Taylor & Pillemer, 2009), but this study is one of the first to establish a relationship between these factors and an

energy tie. The idea that job satisfaction is related to energizers in a system although suggested in the literature has not been established. This association suggests that creating opportunities for leaders to find joy and enthusiasm in their work may well also enable them to energize others. This finding is related to core work on Positive Organizational Scholarship (POS) (Caza & Cameron, 2008), which suggests that factors such as vitality, optimism, and positive states, e.g., energy, are important and can potentially impact the outcomes of both individuals and organizations. A POS perspective stands in contrast with much of the organizational work that often concentrates on more negative aspects of organizations and interactions. This body of work, from which we draw our energy research, indicates the importance of promoting and supporting climates and cultures that acknowledges the positive deviants in systems (Quick et al, 2010). Leaders who embody a more POS orientation may well engender job satisfaction and unleash energizers who may in turn inspire others in meeting important organizational goals.

The second finding about innovative climate and energizers is an equally important result. Although job satisfaction is primarily focused at the individual level, innovative climate is about the larger organizational culture in which people do their work. This finding also relates to POS, but perhaps is more directly centered around the idea of safe psychological spaces in which the work of leadership takes place. These safe spaces allow for risk taking and being vulnerable, all of which are core concepts of trust, which has been associated with positive educational outcomes (Bryk & Schneider, 2002; Brown, Daly, & Liou, 2016; Daly, 2009; Forsythe, Adams, & Hoy, 2011; Moolenaar & Slegers, 2010). Engendering “can do attitudes” and willingness to stretch and grow within leadership ranks may be critical to embodying an innovative climate that supports energizers. Our research is really about the importance of the quality of relationship between and among leaders that has been given short shrift over the most recent decade, which has been increasingly more focused on the technical elements of leadership and instruction. More intentionally focusing on the climate practices and policies necessary to create psychological safe spaces may pay dividends as we enter a post NCLB era and as district leaders look for new indicators of accountability under the Every Student Succeeds Act (ESSA), which explicitly notes climate measures.

Another real issue facing educational systems across the country is churn (Daly & Finnigan, 2011; Finnigan, Daly, & Liou, 2014, 2016). Churn refers to the coming and going of leaders in systems that can cause tremendous disruption and loss of resources (Author et al., 2014). Both higher levels of job satisfaction and innovative climate have been shown in other settings to be associated with retention and connectivity to an organization (Fredrickson, 2003; Kramer & Schmalenberg, 1991). As such focusing on these two aspects may not only support the development of energizers, but also better connect leaders to their systems and reduce the financial, human, and social costs of churn (Daly et al., 2014, 2016).

Our findings also indicate that leaders tend to exchange energy ties with colleagues working at the same level, with same-gender colleagues and colleagues of similar efficacy beliefs. This may be important, as an increase in individual energy within a unit or between similar genders and efficacy beliefs has been associated with overall organization improvement (Casciaro, 2014; Schiuma, Mason, & Kennerley, 2007). Conducting an “energy audit” may enable districts to identify energizers and how they are connected with others in a broader energy network. The results of an energy audit may better help prioritize strategies in districtwide improvement plans and more strategically place leaders in positions of greatest potential. Increasing professional development in schools and districts as well as in leader preparation programs around concepts such as energy audits, social climate, and quality of relationships, and enhancing leader efficacy may be dividends as we enter a new era under ESSA. Explicitly focusing on enhancing organizational energy, which goes beyond individual energy assessments, has been associated with overall organization improvement (Casciaro, 2014), but is not yet tested in educational leadership. Importantly, our study calls for more attention to the affective ties in leadership and how these relations may support the important work of organizational improvement and better outcomes and again provides opportunity to expand notions of accountability under ESSA.

Our data indicate a mismatch in perceptions of both job satisfaction and innovative climate between energy seekers and providers. That is, leaders who are satisfied with their job and more willing to take risks on innovative ideas are more likely to provide energy, but these two characteristics are not related to how

likely a leader is to reach out to others for energy ties. This implies a need for alignment efforts on leadership development, particularly around creative and innovative collaboration. If energizing interactions are a key resource for improving organizations, as suggested by previous studies (Cross et al., 2007), school districts may consider cultivating risk tolerant organizational conditions that encourage novel thinking and experimentation (Sosna, Treviño-Rodríguez, & Velamuri, 2010). These types of cultures may stimulate and support mutual ties and shared energy exchanges (Cross et al., 2007) all of which are important for the development of stronger ties.

Considering the finding of leadership efficacy, we found leaders with similar efficacy beliefs about instructional leadership tend to establish an energy relationship. That is, leaders with high efficacy beliefs tend to share a tie that delivers energy, and so do leaders with lower efficacy beliefs. As efficacy is an important factor in leadership (Leithwood & Jantzi, 2008; Tschannen-Moran & Gareis, 2004) and is associated with the energy ties, better attending to a leader's sense of efficacy will be important. While much of the literature has suggested the importance of aligning efforts and structures in support of efficacy, perhaps investing effort in improving the quality of exchanges between leaders may provide opportunities to build efficacy. Individual action may be driven in part by one's efficacy beliefs, which in this study is related to generating an energy tie. Previous work suggests that efficacy beliefs are also related to how one perceives others' reactions to efforts (Cross & Parker, 2004) and in turn may modify behavior. To close potential gaps in leaders' efficacy beliefs and perceptions school districts may need to first build leader efficacy by creating opportunities for mastery experiences, develop confidence, and providing feedback for leaders about tasks as a way to refine effort (Peshawaria, 2012).

This exploratory work is some of the earliest in examining energy relationships between and among leaders in educational systems and builds on a growing literature base outside of education. Of course being exploratory work there are many areas for additional study including different samples, adding new explanatory variables, testing the causal relationships for the directionality of study variables, and importantly connecting qualitative work to deepen our understanding. That said, at its core this work is

attempting to add knowledge in the important space in the era of ESSA and in the middle of the implementation of the CCSS. Our work argues for a reinvigoration of more affective elements of leadership that have been less attended to during the past decade, which has had a greater focus on more prescriptive approaches. We are not suggesting that a more affective approach supplants the work of the technical core of leadership, teaching, and learning, rather it provides an important and all too often missing supplement to the core. Moving beyond shame and blame in a context of sanction to embrace the tenants of positive organizational scholarship in a supportive environment that nurtures vitality and resilience may well be one of the most important advances we can make as a field as we move into this brave new world of ESSA, which opens up new types of policy instruments and forms of accountability.

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Tables

Table 1: Sample Demographics of Educational Leaders

	Freq. (%)	Mean (SD)
Work level		--
District administrator	40 (41.7%)	
Site principal	56 (58.3%)	
Gender		--
Female	57 (59.4%)	
Male	39 (40.6%)	
Years at the district		13.2 years (8.7)
≤ 7 years	26 (27.5%)	
8-14 years	39 (41.3%)	
≥ 15 years	31 (31.3%)	
Years in current position		5.5 years (4.8)
≤ 2 years	25 (26.3%)	
3-6.4 years	39 (40.0%)	
≥ 6.5 years	32 (33.8%)	

Note: N = 96 educational leaders.

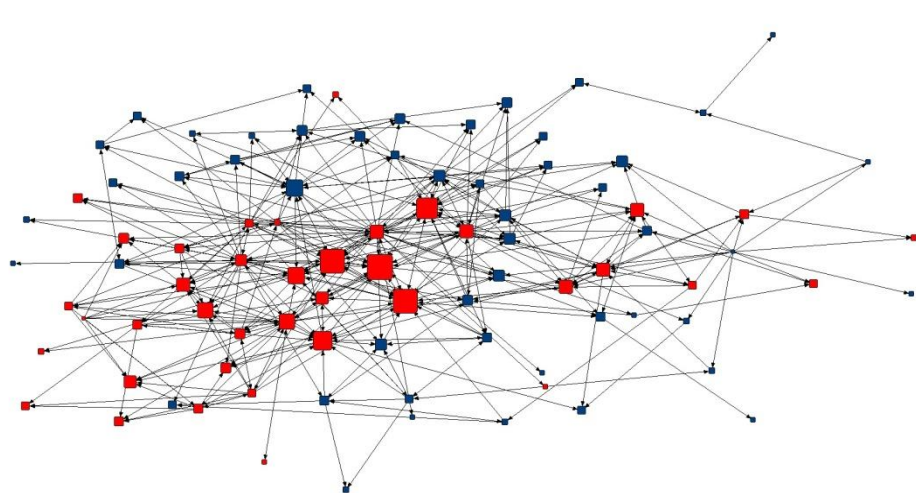
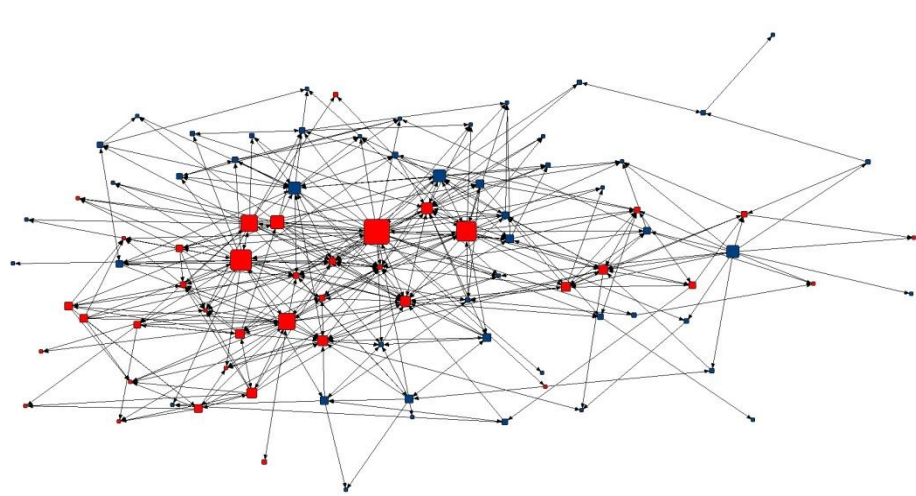
Table 2: Items, Factor Loadings, and Reliability (Cronbach's alpha) of the Scales

Item and scale	Factor loadings
Job satisfaction ($\alpha = .78$)	
Most days I am enthusiastic about my work.	.89
I find real enjoyment in my work.	.87
I am fairly well satisfied with my current job.	.71
I consider my job rather pleasant.	.69
Each day of work does not seem like it will never end.	.65
Innovative climate among district administrators ($\alpha = .96$)	
District administrators are continuously developing new approaches to support instruction?	.94
District administrators have a positive 'can-do' attitude	.93
District administrators are generally willing to try new ideas	.92
District administrators are constantly trying to improve their leadership	.91
District administrators are continuously learning and seeking new ideas	.90
District administrators are willing to take risks to make the district better	.87
District administrators are encouraged to 'stretch and grow'	.83
Innovative climate among site principals ($\alpha = .96$)	
Principals are continuously developing new approaches to support instruction?	.94
Principals have a positive 'can-do' attitude	.93
Principals are generally willing to try new ideas	.92
Principals are constantly trying to improve their leadership	.91
Principals are continuously learning and seeking new ideas	.90
Principals are willing to take risks to make the district better	.87
Principals are encouraged to 'stretch and grow'	.83
Leader efficacy	
<i>Efficacy for instructional leadership</i> ($\alpha = .92$)	
improve student achievement?	.89
improve student achievement with English Language Learners?	.89
generate enthusiasm for a shared vision?	.87
motivate district or school staff?	.83
facilitate learning?	.80
manage change?	.68
create a positive environment?	.60
<i>Efficacy for management</i> ($\alpha = .84$)	
cope with the stress of the job?	.84
handle the time demands of the job?	.82
shape the necessary operational policies/procedures to manage your site/department?	.78
prioritize among competing demands of the job?	.76
handle the paperwork required of the job?	.71
maintain control of your daily schedule?	.70
<i>Efficacy for moral leadership</i> ($\alpha = .79$)	
promote district vision/values throughout the community?	.91
promote a positive image of your site or the district with the media?	.85
promote district initiatives?	.74
promote positive interactions among school or district members?	.64
effectively handle employee discipline?	.42

Note: N = 96 educational leaders.

Directionality of tie	Energy network
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Energy network



Notes: N=96. For the sender sociogram, nodes are sized by outdegree, colored by work level (red = district; blue = site). The larger the node, the more the leader reach out to others for energy relationships. For the receiver sociogram, nodes are sized by indegree, colored by work level (red = district; blue = site). The larger the node, the more the leader is regarded by others as an energy provider.

Table 4: Descriptive Statistics for Educational Leaders

	Min.	Max.	Mean	SD
Whole network characteristics				
Density	--	--	0.04	--
Network reciprocity	--	--	0.18	--
Average degree	--	--	7.13	6.82
Actor network characteristics				
Outdegree	0.00	34.00	4.21	6.40
Indegree	0.00	17.00	4.21	3.54
Ego-reciprocity	0.00	1.00	0.14	0.18
Actor attributes				
Job satisfaction	2.20	4.00	3.51	0.39
IC among district administrators	2.86	6.00	5.01	0.71
IC among site principals	2.86	6.00	5.20	0.70
Efficacy for instructional leadership	3.43	9.00	7.30	1.29
Efficacy for management	3.33	9.00	7.25	1.16
Efficacy for moral leadership	3.33	9.00	7.31	1.18

Note: N = 96 leaders.

Table 5: Parameter Estimates of the p_2 Model, Displaying the Effect of Individual, Demographic, and Dyadic Characteristics on the Probability of Having an Energy Relationship

	Energy relationship		
	Parameter estimate	SE	95% CI
Overall mean			
Density	-2.93	2.53	(-7.85 / 2.67)
Reciprocity	6.27*	0.94	(4.20 / 7.55)
Sender covariates (energy seeker)			
Work level (district /site)	-0.90*	0.34	(-1.48 / -0.18)
Gender (female/ male)	0.57*	0.24	(0.03 / 0.99)
Years of experience at district	-0.03	0.27	(-0.52 / 0.41)
Years at current position	0.53	0.34	(-1.24 / 0.00)
Job satisfaction	-0.38	0.55	(-1.37 / 0.55)
IC among district administrators	0.23	0.22	(-0.13 / 0.63)
IC among site principals	0.01	0.47	(-0.86 / 0.67)
Receiver covariates (energy provider)			
Work level (district /site)	-0.48*	0.15	(-0.80 / -0.24)
Gender (female/ male)	0.43*	0.17	(0.07 / 0.74)
Years of experience at district	0.34*	0.14	(0.06 / 0.62)
Years at current position	-0.51*	0.20	(-0.88 / -0.16)
Job satisfaction	0.30*	0.15	(0.05 / 0.56)
IC among district administrators	-0.28	0.18	(-0.63 / 0.06)
IC among site principals	0.34*	0.13	(0.08 / 0.60)
Relationship covariates			
Different work level (district/site)	-0.52*	0.10	(-0.75 / -0.35)
Different gender (female/male)	-0.21*	0.10	(-0.40 / -0.02)
Different job satisfaction	-0.03	0.11	(-0.26 / 0.18)
Different efficacy for instructional leadership	-0.22*	0.06	(-0.33 / -0.11)
Different efficacy for management	0.05	0.05	(-0.05 / 0.15)
Different efficacy for moral leadership	0.08	0.06	(-0.06 / 0.21)
Random effects			
Sender variance	3.19*	0.86	(2.96 / 0.67)
Receiver variance	0.43*	0.13	(0.31 / 0.80)
Sender-receiver covariance	-0.23	0.21	(-0.66 / 0.16)

Notes: Examination of 7,832 potential dyadic relations from 96 educational leaders.

* $p < .05$.

Table 6: Summary of Hypotheses and Findings

Hypothesis	Results	Findings
<i>H1</i> : Leaders who report higher levels of job satisfaction will have an increased likelihood of sending and receiving energy ties.	Partially Supported	Only for receiving energy ties as energy providers
<i>H2</i> : Leaders will be more likely to share energy ties with others who share a similar level of perceived job satisfaction.	Not supported	Whether leaders possess similar or different levels of perceived job satisfaction does not affect the likelihood of engaging in energy ties with others.
<i>H3</i> : Leaders who perceive a more innovative climate will have an increased likelihood of sending and receiving energy ties.	Partially supported	Only the perceived innovative climate among principals is significantly associated with receiving energy ties (energy providers).
<i>H4</i> : Leaders will be more likely to exchange mutual energy ties with others who share a similar level of efficacy about their ability to implement reform and impact learning.	Partially supported	Only leader efficacy beliefs about instructional leadership is significantly associated with the likelihood of exchanging energy ties with others.
<i>H5</i> : District office leaders will have an increased likelihood of sending and receiving energy relationships in the leadership team.	Supported	
<i>H6</i> : Leaders will be more likely to exchange energy ties with others who work at the same work level (district office or school site) than with others who work at different work levels.	Supported	
<i>H7</i> : Female leaders will have an increased likelihood of sending and receiving energy ties than male leaders.	Not supported	Male leaders tend to more often be identified as energy providers.
<i>H8</i> : Leaders will be more likely to exchange energy ties with same-gender leaders than with leaders of the opposite gender.	Supported	
<i>H9</i> : Leaders who have been working in the district for a longer period of time will have had more time and opportunities to build their network, and consequentially, will have an increased likelihood of sending and receiving energy ties than educational leaders with fewer years of experience in the district.	Partially supported	Except been in their current position for a shorter period of time; and the year of experience is only significantly associated with leaders being identified as energy providers.

Figure

Figure 1: Hypothesized Model of Likelihood of Energy Tie

